

REMARKS

The Office Action dated December 17, 2001 presents the examination of claims 18-27, claims 28 and 29 being withdrawn from consideration. Claims 18-27 are amended. A version of the claims with markings is attached hereto to show the amendments made. Claims 30-35 are added. Support for claims 30-31 is found in the specification on page 3, line 33 to page 4, line 2. Support for claims 32-33 is found on page 1, line 33 to page 2, line 2. Support for claims 34-35 is found on page 2, lines 4-18. No new matter is inserted into the application.

Request for Personal Interview

In the event that the present application is not rendered allowable in response to the instant Reply, the Examiner is respectfully requested to contact Kristi L. Rupert, Ph.D. (Reg. No. 45,702) at 703-205-8000 to schedule a personal interview.

Election/Restriction (Paragraphs 1-2 of the Office Action)

The Examiner has constructively withdrawn claims 28 and 29 from consideration for allegedly being drawn to an invention independent and distinct from that of claims 18-27. Applicants respectfully traverse. Reconsideration of the restriction requirement and rejoinder of the pending claims are respectfully requested.

Applicants respectfully submit that the Examiner has not established that there is an *undue* burden in searching for all claims as required by MPEP § 803. The "undue burden" requirement created by the U.S. Patent and Trademark Office is recited in MPEP § 803:

If the search and examination of an entire application can be made without serious burden, the examiner must examine it on its merits, even though it includes claims to independent and distinct inventions.

The Examiner asserts that claims 18-27 are drawn to a device for receiving a light beam. The amended claims clarify that the instant claims are drawn to a device for the analysis of biological molecules linked to a fluorophore. Claim 28 is directed to a method for detecting and analyzing a specific nucleic acid sequence, while claim 29 is directed to a method of analyzing the sequence of a polynucleotide of interest. The nucleic acid sequence of claim 28 and the polynucleotide of claim 29 are examples of biological molecules which are analyzed with the device of claim 1.

The Examiner states that the device of claims 18-27 is classified in class 435, while the method of claims 28 and 29 is classified in class 436. However, the Examiner makes no statement whatsoever that the search of two additional claims (28 and 29) in class 436 would create an undue burden for the Examiner. As such, Applicants can only assume that an undue burden does not exist.

For these reasons, Applicants respectfully submit that the pending claims be rejoined and examined together in the present application.

Claim Objections (Paragraph 3 of the Office Action)

The Examiner objects to claims 21-27 for being improperly dependent from the canceled claim 1. In response to the Examiner's remarks, Applicants amend claims 21-27 to correct the claim dependencies so that the claims depend only from pending claims. Thus, the instant objection is overcome.

Response to Amendment (Paragraph 4 of the Office Action)

The Examiner requests support for the claims added in the Amendment filed on September 4, 2001.

Claims 18-26 are drawn to a device for the analysis of biological molecules linked to a fluorophore. Support for claim 18 is found in the specification, particularly on page 3, lines 26-31. Support for claim 19 is found on page 4, lines 17-19. Support for claim 20 is found 4, lines 19-21. Support for claim 21 is found on page 4, lines 26-32. Support for claim 22 is found on 4, lines 21-22. Support for claim 23 is found on page 4, lines 7-8. Support for claim 24 is found on page 4, lines 22-23. Support for claim 25 is found on page 4, lines 23-25. Support for claim 26 is found in original claim 14.

Claim 27 is directed to a device for receiving a light beam from a light source used in the excitation, detection, and analysis of biological molecules linked to a fluorophore. Support for claim 27 is found in the specification, such as on page 1, line 29 to page 2, line 2.

Claims 28 is directed to a method for detecting and analyzing a specific nucleic acid sequence, while claim 29 is directed to a method of analyzing the sequence of a polynucleotide of interest. Support for claims 29 and 30 is found in the specification, such as on page 2, lines 4-18.

Applicants respectfully submit that the above statements properly identify support for claims 18-29 in the specification such that 37 C.F.R. § 1.121(b)(2)(iii) is satisfied.

Rejections under 35 U.S.C. § 112, second paragraph (Paragraphs 5-9 of the Office Action)

The Examiner rejects claims 18-27 under 35 U.S.C. § 112, second paragraph for allegedly being indefinite. Applicants respectfully traverse. Reconsideration of the claims and withdrawal of the instant rejection are respectfully requested.

Claims 18-27

The Examiner rejects claims 18-27 for allegedly being confusing. Specifically, the Examiner asserts that it is unclear

whether the claims are intended to be device claims. Applicants clarify that the claims do encompass devices *per se*, and amend claim 18 such that the components of the device are more clearly set forth. Thus, the instant rejection is overcome.

Claims 18-27

The Examiner asserts that claims 18-27 are incomplete for missing "necessary structural connections." In response to the Examiner's remarks, Applicants amend claims 18-27 to clarify the structural relationships that exist between the components of the claimed device. Thus, the instant rejection is overcome.

Claims 21-27

The Examiner points out that claims 21-27 depend from canceled claim 1. In response to the Examiner's remarks, Applicants correct the claim dependencies so that the claims only depend from pending claims. Thus the instant rejection is overcome.

Applicants respectfully submit that the instant claims fully comply with 35 U.S.C. § 112, second paragraph. Withdrawal of the instant rejection is respectfully requested.

Rejection under 35 U.S.C. § 102(b) (Paragraph 10 of the Office Action)

The Examiner rejects claims 18 and 19 under 35 U.S.C. § 102(b) for allegedly being anticipated by Squirrell '337 (USP 5,750,337). Applicants respectfully traverse. Reconsideration of the claims and withdrawal of the instant rejection are respectfully requested.

Squirrell '337 discloses a "fibre optic evanescent wave device" comprising a light source (six watt tungsten filament), filters and masks directing the light, a beam splitting device, a focusing lens, a waveguide, and a detector device (see column 7, lines 13-30).

Applicants respectfully submit that Squirrell '337 fails to anticipate the present invention. To anticipate a claim under the meaning of 35 U.S.C. § 102, the cited reference must teach every element of the rejected claim. U.S. Pat. & Trademark Off., *Manual Pat. Examining Proc.* § 2131 (8th ed. 2001). In the instant case, Squirrell '337 fails to teach each and every element of the rejected claims 18 and 19.

Claim 18 is directed to a device for the analysis of biological molecules linked to a fluorophore comprising a light source emitting at least one laser beam; a waveguide support capable of supporting total internal reflection comprising a top surface, a bottom surface and at least one edge surface, wherein said biological molecules are affixed to said top surface; means

for directing said at least one laser beam into said edge of said waveguide support; and a charge couple device for detecting emission spectra of said biological molecules. Claim 19 is directed to the device of claim 18, further comprising a transparent hexahedron.

Squirrell '337 fails to disclose a light source emitting at least one laser beam. The light source used by Squirrell is a tungsten filament. As noted above, the device of the present invention comprises a light source emitting at least one laser beam. Support for this feature of the present invention is found on page 2, line 33 to page 3, line 2.

Thus, Squirrell '337 fails to disclose each and every claimed element of the present invention, and cannot anticipate the present invention under the meaning of 35 U.S.C. § 102. Withdrawal of the instant rejection is respectfully requested.

Conclusion

Applicants respectfully submit that the above remarks and/or amendments address and overcome the outstanding rejections of record. The present application is now in condition for allowance. Early and favorable action by the Examiner is therefore respectfully requested.


Pursuant to the provisions of 37 C.F.R. §§ 1.17 and 1.136(a), the Applicants hereby petition for an extension of three (3) months

to July 17, 2002 in which to file a reply to the Office Action. The required fee of \$460.00 is attached to the Notice of Appeal, which is being filed concurrently herewith.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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CLAIM VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The following claims are amended.

Claim 18. (Amended) A device for [receiving a light beam from a light source used in] the analysis of biological molecules linked to a fluorophore, comprising: [wherein said biological molecules are affixed to a top surface of]

a light source emitting at least one laser beam;

a waveguide support capable of supporting total internal reflection [and further] comprising a top surface, a bottom surface and at least one edge surface, wherein said biological molecules are affixed to said top surface;

[said device comprising] means for directing said at least one laser [light] beam into said edge of said waveguide support; and

a charge couple device for detecting emission spectra of said biological molecules.

Claim 19. (Amended) The device of claim 18, further comprising a transparent hexahedron [to direct said light beam into said edge of said waveguide support to effect total internal reflection, placed] located between said light source and said waveguide support,

wherein said transparent hexahedron occupies the same plane as said at least one laser [light] beam and revolves around an axis

perpendicular to said at least one laser [light] beam and directs
said at least one laser beam into said edge of said waveguide
support to effect total internal reflection.

Claim 20. (Amended) The device of claim 18 [1], further
comprising an optical wedge [to direct said light beam into said
waveguide support to effect total internal reflection, wherein said
optical wedge is placed] located between said light source and said
waveguide support and [revolves] revolving around an axis
approximating said at least one laser [light] beam,

wherein said optical wedge directs said at least one laser
beam into said waveguide support to effect total internal
reflection.

Claim 21. (Amended) The device of claim 18 [1], further
comprising a cylindrical lens [to direct said light beam into said
edge of said waveguide support to effect total internal reflection,
wherein said cylindrical lens is placed] located between said light
source and said waveguide support [for focusing said light beam
into a shape smaller than said edge of said waveguide support, and
moves] and moving perpendicular to the plane of said at least one
laser [light] beam,

wherein said optical wedge focuses said at least one laser beam into a shape smaller than said edge of said waveguide support to effect total internal reflection.

Claim 22. (Amended) The device of claim [1] 18, wherein said means for directing said at least one laser beam comprises a mirror located adjacent to said waveguide support,

wherein said mirror directs said at least one laser [to direct said light] beam into said edge of said waveguide support to effect total internal reflection[, wherein said mirror is placed adjacent to said waveguide].

Claim 23. (Amended) The device of claim [1] 18, further comprising a diffraction grating [to selectively allow light of a specific wavelength to excite said fluorophore, wherein said diffraction grating is placed] located between said light source and said waveguide support,

wherein said diffraction grating selectively allows light of a specific wavelength to excite said fluorophore linked to said biological molecules.

Claim 24. (Amended) The device of claim [1] 18, further comprising an optical prism located [to direct said light beam into said edge of said waveguide support to effect total internal

reflection, wherein said optical prism is placed] adjacent to said waveguide support,

wherein said optical prism directs said at least one laser beam into said edge of said waveguide support to effect total internal reflection.

Claim 25. (Amended) The device of claim [1] 24, further comprising a transparent liquid [to direct said light beam into said edge of said waveguide support to effect total internal reflection, wherein said transparent liquid is placed] located between said waveguide support and said optical prism and possesses a refractive index about equal to the refractive indices possessed by said waveguide support and said optical prism,

wherein said transparent liquid directs said at least one laser beam into said edge of said waveguide support to effect total internal reflection.

Claim 26. (Amended) The device of claim [1] 18, further comprising bandpass filters [to separate emission spectra, wherein said bandpass filters are placed] located between said waveguide support and [a charge - coupled] said charge coupled device,

wherein said bandpass filters are positioned to receive emitted light and separate emission spectra from said fluorophore.

Claim 27. (Amended) A device for receiving a laser [light] beam from a light source used in the excitation, detection, and analysis of biological molecules linked to a fluorophore[, wherein said biological molecules are affixed to a top surface of a waveguide support further comprising a bottom surface and at least one edge surface, said device] comprising:

a) a light source emitting at least one laser beam;
 b) a waveguide support capable of supporting total internal reflection comprising a top surface, a bottom surface and at least one edge surface, wherein said biological molecules are affixed to said top surface;

c) a transparent hexahedron [to direct said light beam into said edge of said waveguide support to cause effect internal reflection, wherein said transparent hexahedron is] located adjacent to said light source, [occupies] occupying the same plane as said at least one laser [light] beam, and [revolved] revolving around an axis perpendicular to said at least one laser [light] beam;

b) an optical wedge [to direct said light beam into said edge of said waveguide support to effect total internal reflection, wherein said optical wedge is] located adjacent to said transparent hexahedron and [revolves] revolving around an axis approximating said at least one laser [light] beam;

c) a cylindrical lens [to direct said light beam into said edge of said waveguide support to effect total internal reflection, wherein said cylindrical lens is] located adjacent to said optical wedge, [focuses said light beam into a shape smaller than said edge of said waveguide support,] and [moves] moving perpendicular to the plane of the at least one laser [light] beam, wherein said cylindrical lens focuses said at least one laser beam into a shape smaller than said edge of said waveguide support; and

d) a mirror [to direct said light beam into said edge of said waveguide support to cause total internal reflection, wherein said mirror is] located adjacent to said cylindrical lens;

wherein said transparent hexahedron, optical wedge, cylindrical lens, and mirror direct said at least one laser beam into said edge of said waveguide support to effect total internal reflection.

Claims 30-35 are added.